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1. [N13A-T001: Naval Platform Aero-Optic Turbulence and Mitigation Methodology](#)

Release Date: 01-25-2013 Open Date: 02-25-2013 Due Date: 03-27-2013 Close Date: 03-27-2013

OBJECTIVE: Develop modeling and simulation capability to resolve negative effects of air flow pattern of naval aviation platforms such as the rotary and fixed winged aircraft.

DESCRIPTION: Past efforts in platform aero-optic effects have emphasized the development of tool sets via Modeling and Simulation (M & S) to visualize the problem, but mitigation of the negative effects has not been at the forefront of follow-on efforts. Comparing experimental data to simulations is very important to understanding the problem and will be essential to develop mitigation techniques.

STTR Navy

2. [N13A-T002: Modeling of Integrally Bladed Rotor \(IBR\) Blends](#)

Release Date: 01-25-2013 Open Date: 02-25-2013 Due Date: 03-27-2013 Close Date: 03-27-2013

OBJECTIVE: Develop and demonstrate an analytical means to predict the effect of large airfoil blends on integrally bladed rotors. DESCRIPTION: Integrally bladed rotors (IBRs) are prevalent in the fan and compressor sections of the current and emerging fleet of Department of Defense (DoD) gas turbine engines such as the F119 and F135. While IBRs have inherent weight and performance benefits, they can require more man hours to repair and therefore become more costly than rotors with removable blades.

STTR Navy

3. [N13A-T003: Maneuver Prediction and Avoidance Logic For Unmanned Aircraft System \(UAS\) Encounters with Non-Cooperative Air Traffic](#)

Release Date: 01-25-2013 Open Date: 02-25-2013 Due Date: 03-27-2013 Close Date: 03-27-2013

OBJECTIVE: Develop an analytic framework and methodology to address unanticipated maneuver encounter modeling, collision risk estimation and ownship maneuver logic to support optimal operation of manned and unmanned aircraft in a complex and congested airspace. DESCRIPTION: With the widespread introduction of unmanned aircraft, the nature of the airspace will change significantly over the next 10-20 years as they are fully integrated into both segregated and non-segregated airspace.

STTR Navy

4. [N13A-T005: Ultra-Wideband, Low-Power Compound Semiconductor Electro-optic Modulator](#)

Release Date: 01-25-2013 Open Date: 02-25-2013 Due Date: 03-27-2013 Close Date: 03-27-2013

OBJECTIVE: Develop and demonstrate a compound semiconductor external electro-optic modulator for ultra-wideband RF/analog signal transmission on aircraft DESCRIPTION: New military communications, sensing and surveillance systems require ever-faster real time acquisition and transmission of electronic signals to achieve continuous sensing of

electromagnetic spectrum. For the development and utilization of such systems ultra-wide bandwidths, low power operation, immunity to interference and survival under high input signals are essential.

STTR Navy

5. [N13A-T006: Low-Cost-By-Design Mid-Wave Infrared Semiconductor Surface Emitting Lasers](#)

Release Date: 01-25-2013 Open Date: 02-25-2013 Due Date: 03-27-2013 Close Date: 03-27-2013

OBJECTIVE: Develop high-power, surface-emitting semiconductor lasers or beam-combined surface-emitting laser arrays emitting at ~4.5 um range. DESCRIPTION: Monolithic surface-emitting (SE) semiconductor lasers hold promise for significant advantages over edge-emitting lasers in terms of both reliable operation and manufacturing cost. Device-failure modes of edge-emitting lasers that are triggered by high facet optical-power densities and/or temperatures, which, in turn, generally limit the reliable output power of edge-emitting lasers, are thus eliminated.

STTR Navy

6. [N13A-T007: Multi-scale Peridynamics Theory for Corrosion Fatigue Damage Prediction](#)

Release Date: 01-25-2013 Open Date: 02-25-2013 Due Date: 03-27-2013 Close Date: 03-27-2013

OBJECTIVE: Develop innovative techniques using peridynamics theory to predict corrosion fatigue across length and time scales in Naval aircraft. DESCRIPTION: Corrosion damage remains a major challenge in aging Navy aircraft fleet with implications for both the safety and economic operation of components and structures. Of particular interest is corrosion fatigue, which can severely limit material lifetime and performance. Corrosion fatigue is the degradation of a material due to interaction of corrosion and mechanical stress due to cyclic loading.

STTR Navy

7. [N13A-T008: Interlaminar Mode I and Mode II Fracture Toughnesses in Ceramic Matrix Composites \(CMCs\)](#)

Release Date: 01-25-2013 Open Date: 02-25-2013 Due Date: 03-27-2013 Close Date: 03-27-2013

OBJECTIVE: Develop and demonstrate innovative interlaminar Mode I and Mode II fracture toughness test methods for CMCs. DESCRIPTION: Military aircraft platforms are targeting CMCs for aeroengine applications with a goal of increase in specific power and performance. Concerns still exist regarding CMCs in terms of their transition, maturation, reliability, and environmental durability. In particular, due to their laminated architectures, CMCs are significantly lower in mechanical properties in interlaminar direction than in in-plane counterpart.

STTR Navy

8. [N13A-T009: High Efficiency Computation of High Reynolds Number Flows](#)

Release Date: 01-25-2013 Open Date: 02-25-2013 Due Date: 03-27-2013 Close Date: 03-27-2013

OBJECTIVE: The objective is to develop a computational capability for high Reynolds number flows that provides a significant improvement in computational efficiency over existing capabilities. DESCRIPTION: The Navy seeks a computational capability for high Reynolds number flow(1) that provides a significant improvement in computational efficiency over existing software packages. Flows will be three dimensional, viscous, incompressible, with embedded solid obstacles(2). The capability must allow for inhomogenous media.

STTR Navy

9. [N13A-T010: Prehensor for one atmosphere diving suit](#)

Release Date: 01-25-2013 Open Date: 02-25-2013 Due Date: 03-27-2013 Close Date: 03-27-2013

OBJECTIVE: Develop a manipulator for an exosuit or ROV that possesses multiple fingers and an opposable/indexable thumb that more closely mimics the dexterity and flexibility of the human hand. DESCRIPTION: Current exosuits and remotely operated vehicles (ROVs) are equipped with manipulators that resemble lobster claws or pliers that can simply open and close.

STTR Navy

10. [N13A-T011: Novel Approaches to Bond Quality Nondestructive Evaluation with Emphasis on Kissing Bond Detection and Bond Line Assessment](#)

Release Date: 01-25-2013 Open Date: 02-25-2013 Due Date: 03-27-2013 Close Date: 03-27-2013

OBJECTIVE: To identify and demonstrate the feasibility of previously unexplored methods for the nondestructive evaluation (NDE) of adhesive bond quality, including in-particular kissing bonds, both as initially fabricated and as a function of service. Bond quality implies at least a semi-quantitative indication of bond strength. DESCRIPTION: Current state-of-the-art in bondline quality inspection is capable of identifying the location and size of delaminations in bonded joints.

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